SPA Patent Description

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1 Purpose

The purpose of this document is to describe the technical details of a Web/WAP buying mechanism as part of patent registration documentation. This Web/WAP buying mechanism enables users to purchase products and services in virtually any site, which accepts credit cards, without using their own credit card. To the best of our knowledge this generalized buying principal does not exists today as a business model, nor does the technology that we are using to implement it.

2 Overview

The Secure Private Agent (SPA), which is a Web/WAP based technology and business model, along with its supporting back-office infrastructure, is in the basis of our unique Web/WAP buying and service provisioning technology. SPA allows users to surf the Web through a browser (or a WAP appliance) as they regularly do, and to use SPA services in a Just-In-Time (JIT) manner. The cornerstone technology, which SPA is offering to the users, is the capability to shop in potentially any E-Commerce site, which accepts credit card payments, and to buy there without using their own credit card number.

Some key features of this technology are:

- There is no need to download and install any software.

  The SPA can run as a Java applet or other on-the-fly service, which runs in the user's browser or its environment. The SPA can also be installed, in which case it may offer additional services and capabilities.

- The SPA technology works with virtually any E-Commerce site.

  In order to perform a buy using the SPA, there is no need for an a-priori business relationship between the E-Commerce site and Appletix. The SPA may offer additional services for E-Commerce site, which are part of its affiliates network.

- Users can potentially perform anonymous transaction.

  The technology behind SPA allows the users to stay anonymous to the site (and potentially other mediators), hiding their virtual characteristics, such as IP address, as well as their real-world detail, such as name and credit card number.

- The SPA learning intelligence can assist users in managing Web forms.

  Part of the SPA technology is a learning intelligence that very quickly learns of new Web forms, as they become active on the Web. This engine can automatically fill new forms (such as shipping address and username / password) with the user's details and thus be used also as a single sign-on solution.

3 Architecture

The SPA mechanism is built of three components, which are developed and operated by Appletix, and additional three components, which are part of the overall process. The following figure outlines the relationship between the components, within the architecture framework.

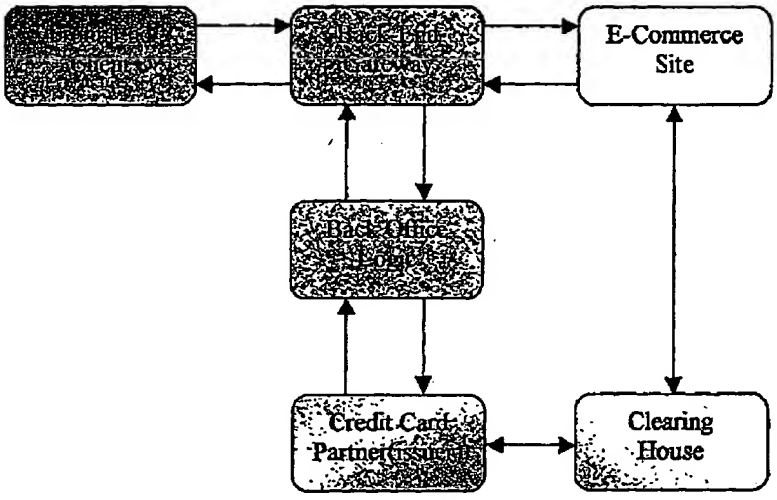

Figure 1: Major architecture components and their relationship

The three SPA components, which are developed and operated by Appletix, are:

- Front-End Client (FEC)

  This component sits in the user's browser, which is the client side. It controls some of the browser's activity and interacts with the user. The FEC communicates with the BEG through a secure channel, relaying user requests and receiving information for the interaction with the user. The FEC also provides the user interface for SPA's services.

- Back-End Gateway (BEG)

  The BEG sits on one of Appletix' servers. It interacts directly with the FEC and the browser at the user's side, with the ECS in which the user is surfing and with the BOL. The role of the BEG is to follow the users surfing path and to interact with the information flow to the user. This is done mainly by identifying key situations where an SPA service is required or appropriate. Note that within a WAP architecture the BEG can actually run on the WAP Server that translate Web content (HTML) to WAP (WML) and ultimately enhance its functionality.

- Back-Office Logic (BOL)

  The BOL is managing the entire user and transaction related information. It manages the user's profile and account, and handles the transaction authorization and logging. The BOL communicates to the BEG the user and

transaction details and communicates with the CCP to close the loop on the transaction authorization information.

Additional three components, which are part of the overall process, but also exist independently of the SPA system, are:

- E-Commerce Site (ECS)

  Actually, the ECS has no special role in the SPA scheme, except for doing its usual functions, i.e. serving Web pages and processing the usual communication messages. The ECS is not aware of being part of the SPA – the mechanism is completely transparent to it. Of course, the ECS can join Appletix affiliation program and add SPA components that will enhance its SPA functionally, but this is completely optional.

- Credit-Card Partner (CCP)

  The CCP is the component that issues Appletix' credit cards, that are used during the buying process managed by the SPA. It is also involved in the authorization process as part of its usual function in processing a credit card payment. The BOL, however, interacts with the CCP in order to set up the authorization information for Appletix' transaction, as a fraud protection measure.

- Clearing House (CH)

  The CH plays its usual credit-card-world role within the SPA architecture. It accepts credit card payment information from the ECS and clears those transactions. The charges are forwarded to the credit card issuer, which maintains the card's credit. The CH component is totally un-aware to the existence of the SPA system, and to its involvement in the SPA process.

4 Business Process

The following steps briefly describe the business process of using the SPA system and the relationship between the User, Appletix and E-Commerce Site:

1. Users are registered in Appletix, identifying personal payment information (e.g. Credit-Card or Bank Account).
2. Users are assigned a credit limit.
3. When users desire to buy in the Internet, they log into Appletix site and assigned a Secure Private Agent (SPA), a software implementing the patent (see tech. patent).
4. The SPA is monitoring the users buying process.
5. The users select the products or services to purchase.
6. When Credit-Card payment details are required, the users fill in some dummy Appletix payment information or let the SPA do it automatically.
7. The users' Credit-Card information is never sent to the shopping site.
8. All payments to the sites are done by Appletix.
9. Appletix debits the users' credit on behalf of their purchases, and is the only party to have the access to the user personal details.
10. The Internet site are not aware to the fact that Appletix is involved in the transaction on behalf of the users, except for the payment details.

5 Transaction Sequences

There are many variations in which the SPA system can be implemented. These implementations may differ in the location where specific functions are executed, the depth of services, which are provided by the SPA, the amount of automatization supported by the SPA, etc. This section describes the specific details of a sample implementation of the SPA.

5.1 Registration

1. The user surf to Appletix site.
2. Appletix Web server sends the Home Page.
3. The user selects SPA Registration.
4. Appletix Web server sends the SPA Registration form.
5. The SPA Registration form includes the following fields:
   - 5.1 Username.
   - 5.2 Password.
   - 5.3 Numeric ID (e.g. international phone number – for IVR service).
6. The user sends the registration information.
7. Appletix BOL checks availability of the username.
   - 7.1 If unavailable, user is requested to select new username (go to 5).
8. BOL creates a new user profile.
9. User is offered to add authentication information to the profile.
   - 9.1 Best friend's name.
   - 9.2 Mother maiden name.
   - 9.3 City of birth.
10. End of registration.

5.2 Surfing With SPA

1. The user surf to Appletix site.
2. BEG identifies the user using a cookie.
3. BEG sends a personalized user services page, which loads the SPA Java applet (FEC).
4. FEC launches a new browser window, which displays HTML with a FRAMESET.
   - 4.1 The new window does not display the Address (URL) and Bookmarks menu-bars.
   - 4.2 The top frame displays the FEC user interface, which includes
     - 4.2.1 Address (URL) bar.
     - 4.2.2 Bookmarks bar.
     - 4.2.3 Interaction area (for talk/messages/ads).
     - 4.2.4 Functional buttons.
   - 4.3 The bottom frame displays the user's preferred home page (any Internet site), or a selection between several preferred sites.
     - 4.3.1 All links in the displayed HTML are pointing to BEG and include the original URL information.
5. The user type in a URL in the FEC Address bar or clicks a link.
   - 5.1 For a typed URL, FEC sends the URL to BEG, which fetches the appropriate content and processes the links to point to BEG.
   - 5.2 For a link click, BEG receives an HTTP GET request, fetches the appropriate content and processes the links to point to itself.
6. The bottom frame displays a new content from the requested link or URL.
7. End of Surfing With SPA.

5.3 Buying Using SPA

1. The user surf with SPA (See 5.2).
2. The user arrives to an ECS.
3. The user selects products or services and places them in the shopping cart.
4. The user selects to Checkout.
5. The ECS sends a form with fields for shipping details.
6. BEG identifies the shipping form and inserts the user's shipping details to the form fields.
7. BEG sends the modified form to the user's browser.
8. The user modifies the shipping form, if needed, and sends it.
9. BEG receive the shipping information, records it in the user's profile and forward them to the ECS.
10. The ECS processes the shipping information and sends a payment form.
11. BEG identifies the payment form and inserts dummy Appletix values to the form fields.
12. BEG sends the modified form to the user's browser.
13. The user reviews the payment information, changes nothing, and sends it.
14. BEG receive the payment information, which indicates payment by Appletix (the dummy Appletix values).
15. BEG query BOL for and authentication information for the user.
16. BEG sends a challenge to FEC, to be answered by the user.
17. FEC pops a window, asking the user's approval for the transaction and presenting the challenge.
18. The user answers the challenge for approval.
19. BEG receives the answer and checks if the challenge has been met.
    - 19.1 If not, BEG sends transaction cancellation page to the user browser, which may Back and re-send the payment information (goto 14).
20. BEG informs BOL about the transaction.
21. BOL generates unique transaction identifier.
22. BOL informs CCP about the transaction details.
    - 22.1 Credit card number to be used.
    - 22.2 Expiration date to be used.
    - 22.3 Cardholder name to be used.
23. BOL returns transaction details to BEG.
24. BEG sends payment information with BOL's transaction details to ECS.
25. ECS authorizes the payment information with CH.

26. CH authorizes the payment information with CCP.
27. CCP approves the transaction based on BOL information.
28. CH approves the transaction based on CCP approval.
29. ECS approves the transaction based on CH approval.
30. ECS sends confirmation information, optionally with reference number.
31. CCP informs BOL about the transaction approval.
32. BOL debits the user account by the transaction amount.

☞ If ECS authorization is done offline, the actions order from step 25 onward may be slightly different. ECS may send confirmation information before actually authorizing the transaction. However, the authorization process is the same and the final messages between CCP and BOL remains.

6 Functional Implementation

This chapter highlights some of the functional implementation of the components in the SPA architecture. The main focus is on Web transactions. However, the changes required in order to operate under the WAP framework are not significant.

6.1 FEC

Num	Function	Implementation
1	Open browser window	Standard applet function
2	Display URL in browser window	Standard applet function
3	Get Address (URL)	Customized function with AWT text field, which retrieve the URL through BEG functions (1-3)
4	Challenge Username/Password	Customized function which accepts login info from the user and sends to BEG for verification
5	Activate agent command	Customized function which allow the user to select a command from a text or graphic menu and sends it to appropriate BEG function for execution
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6.2 BEG

Num	Function	Implementation
1	Get URL from ECS	Standard Java/Web server function
2	Reformat URLs in HTML	Customized function to modify URLs in HTML tags such as <a, <img, <area, <form
3	Send HTML to browser	Standard Web server function
4	Get POST information from browser	Standard Java/Web server function
5	Filter POST fields	Customized function to substitute field values by others
6	Send POST information to ECS	Standard Java function
7	Identify ECS/FORM structure	Customized function that generate FORM "signature" and compare to existing forms database
8	Change FORM values	Customized function that modifies the FORM's values
9	Learn FORM-Profile matching	Customized function that learns new mapping of FORM fields and user profile fields
10	Collect FORM to profile	Customized function that collects user information based on user filled form and existing FORM-Profile mapping
11	Reformat HTML privacy tags	Customized function to modify HTML tags that may endanger user privacy such as <script, <embed, etc.
12	Sign purchase track command	Customized function which saves the HTML pages that were served to the user during purchase and sign them as future proof for T&Cs.
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6.3 BOL

Num	Function	Implementation
1	Clear user payment	Customized function which debits the user's credit card
2	Debit internal account	Customized function which debits the user's internal account based on a purchase amount
3	Credit internal account	Customized function which credits the user's internal account
4	Internal transfer	Customized function which moves credit between internal account, with optional commission
5	Credit purchase	Customized function which accepts user credit purchase order, clear the payment and credit the internal account
6	Open new user profile	Customized function which registers a new user in the system
7	Open new user account	Customized function which activates the user's ability to buy using SPA
8	Retrieve/Update user profile	Customized function which retrieves information from the user's profile and optionally updates this information
9	Retrieve user account	Customized function to report on account status, balance and transactions (changes only via credit and payment processing)
10	Generate transaction ID	Customized function which identifies a user SPA transaction, to be used either as part of Appletix credit card number or as part of the card holder's name
11	Send transaction information	Customized function which send transaction information, including its ID, to CCP to support payment authorization
12	Receive transaction information	Customized function which receive CCP payment information that was sent by the ECS and authorized
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6.4 CCP

Num	Function	Implementation
1	Receive payment information	Customized function which receive authorization information for a payment transaction
2	Send payment information	Customized function which informs BOL about payments which were previously authorized by its and were authorized by CCP
3	Validate payment information	Customized function that compares a ECS information with BOL authorized transactions to determine a transaction validity (fraud protection)
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